Report as of FY2010 for 2010MT224B: "Student Fellowship: Fine Sediment Infiltration and Sediment Routing in the Clark Fork River, Montana"

Publications

Project 2010MT224B has resulted in no reported publications as of FY2010.

Report Follows

Fine Sediment Infiltration in a Gravel-Bedded River

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Summary

Pulses of fine sediment in gravel-bedded rivers can cause extensive fine sediment infiltration, potentially altering river morphodynamics and aquatic ecosystems. Fine sediment infiltration occurs when sand and silt are deposited into void spaces between gravel at the riverbed. This study takes advantage of a dam-removal that caused the release of contaminated fine sediment into a gravel-bed river to investigate the magnitude, duration, and spatial pattern of infiltration. Comparison of metal concentrations of fine sediment collected in TSS samples, infiltration bags, and freeze cores suggests that these samples were supplied from different source populations; the fine grained sediment in transport is largely unseen at depth in the freeze core data. Variation of freeze core samples, spatially and at depth, indicate that reworking of sediment largely dictated infiltration of contaminated reservoir sediments through this reach.

Work to date

There are three phases of my research on fine sediment infiltration: field work, metal analysis and modeling. Fieldwork and metal analysis have been completed. Modeling with this data will be completed during the upcoming Spring semester.

Fieldwork consisted of bulk sampling, suspended sediment collection, infiltration bags installation and freeze cores. On average, Freeze core samples had the lowest metals concentration, with higher concentration in infiltration bag samples. Concentrations were the highest in the suspended sediment samples. This distribution indicates that at the time of the sediment pulse resulting from the erosion of contaminated sediment in the Milltown reservoir, there was little available pore space in the field area. The suspended sediment sample demonstrates that sediment moving through the system contains contaminates. Infiltration bags indicate that if pore space is made available the sediment in transport will deposit.

Future Work

Variation of metal concentrations among the freeze core and infiltration bag data will be investigated in the context of a 2-D model. Local flow variation over the course of the hydrograph could dictate pore space creation and thus explain areas of higher metal concentration.

This work has been presented at the 2010 American Geophysical Union Conference (http://adsabs.harvard.edu/abs/2010AGUFM.H31E1052E). Once modeling is complete, findings will be submitted to a peer-reviewed journal.